The Impact of AI on Leadership

Norbert Hettstedt, PhD Student at
Comenius University in Bratislava, Slovakia
Heppenheim Germany

Abstract

The rapid advancement of artificial intelligence (AI) technologies is transforming the nature of leadership in organizations across industries. As AI systems become increasingly integrated into various aspects of organizational operations, leaders must adapt to this new landscape and develop the skills and strategies needed to harness the power of AI while mitigating its risks and challenges. This paper explores the impact of AI on leadership, focusing on four key areas: 1) the changing roles and responsibilities of leaders in the AI era; 2) the opportunities and challenges associated with AI-supported leadership practices; 3) the importance of employing AI for team development and performance; and 4) the critical ethical considerations and principles of responsible AI leadership.

Drawing on a comprehensive review of the latest research and thought leadership, we argue that the successful adoption of AI in organizations requires a fundamental shift in leadership competencies and mindsets. Leaders must develop digital literacy and AI fluency, cultivate the ability to lead diverse, distributed teams, and effectively manage human-machine collaboration. They must also leverage AI technologies to streamline processes, enable data-driven decision-making, and enhance team communication, collaboration, and performance.

However, we also highlight the critical importance of responsible AI leadership, which involves addressing bias and ensuring fairness in AI systems, promoting transparency and explainability of AI-aided decisions, prioritizing the privacy, security, and governance of workforce data, and enabling human agency and accountability. We argue that the success of AI-augmented leadership depends on striking the right balance between leveraging the power of AI and preserving the essential human qualities that define effective leadership, such as judgment, empathy, and ethics.

Looking to the future, we envision a model of AI-augmented leadership where human leaders and AI systems work together symbiotically to drive organizational performance, innovation, and positive social impact. To realize this vision, we call on leaders to invest in their own learning and development, champion the responsible and ethical use of AI, and foster a culture of continuous learning, experimentation, and adaptation. By doing so, leaders can position themselves and their organizations for success in an increasingly AI-driven world, while ensuring

that the benefits of AI are harnessed in a way that promotes human well-being, fairness, and social responsibility.

I.0 INTRODUCTION

The introduction of artificial intelligence (AI) has brought about a new era of technological disruption, the modern workplace is now revolutionized, and the industry is now redefined. As AI is getting more and more developed and is used in different areas, its impact on the working world is more and more obvious. Naqvi (2017) rightly calls this the "cognitive era or the fourth industrial revolution" (p. 244), pointing out the great influence of intelligent machines on human society. The quick spread of AI technologies has not only changed the nature of work but also has brought a new era of leadership. The organizations are now facing the problems and the opportunities that are caused by AI, and therefore, it is very important to see how this technology is changing the role of the leaders and the skills that are needed to go through this unknown area.

The AI has the power to change the working world by the fact that it can enhance and even replace the human labor in a lot of industries. Frey and Osborne (2013) calculate that about half of the human jobs will be substituted by AI in the near future (as cited in Naqvi, 2017, p. 245). This seismic shift in the workforce composition necessitates a reevaluation of leadership strategies and competencies. Leaders must adapt to managing a hybrid workforce comprising both human and intelligent machine agents, each with their unique strengths and limitations. Moreover, the rapid pace of technological change driven by AI requires leaders to be agile, continuously learning and innovating to stay ahead of the curve. As Schwab (2017) notes, the fourth industrial revolution demands leaders who can "shape a future that works for all by putting people first and empowering them" (as cited in Naqvi, 2017, p. 247).

To effectively explore the impact of AI on leadership, it is essential to clarify key terms. Artificial intelligence, as defined by McCarthy (1956), refers to "the science and engineering of making intelligent machines, especially intelligent computer programs" (as cited in Ronquillo et al., 2021, p. 3708). This broad definition encompasses various subfields such as machine learning, natural language processing, and robotics, all of which contribute to the development of smart machines capable of performing tasks that typically require human intelligence. In this paper, leadership is considered as the capability to affect and direct others to the achievement of common goals, adjusting to the changing needs of the organization and its stakeholders.

The AI's effect on leadership should be the main issue of the research. With the AI technologies being more and more integrated into the organizations, the leaders have to go through the unexplored area which is full of both difficulties and opportunities. On the one hand, AI can be a great help in the decision-making process, the simplification of operations and the discovery of new ways to innovate (Kolbjørnsrudet al., 2016, as cited in Van Quaquebeke&Gerpott, 2023, p. 267). On the contrary, the use of AI systems is accompanied by the most important ethical issues such as bias, transparency, and accountability (Ronquillo et al., 2021). The leaders have to find a

way to use the AI for the good and at the same time to prevent the risks that are associated with it to make the AI a responsible and sustainable technology.

This paper is intended to be a full study of the influence of AI on leadership, concentrating on the problems, the chances, and the future directions. The research question guiding this inquiry is: "What will be the effect of artificial intelligence on leadership in complex organizations in the near future?" (Ronquillo et al., 2021, p. 1). This paper will look at this question from both the academic and the practical points of view and thus, it will add to the existing knowledge on AI and leadership, giving the leaders the practical recommendations they need to navigate this uncharted territory.

The paper is structured as follows: The second section of the book is about the changing role of leadership in the AI era. It talks about the main factors that are shaping the leadership in the AI-driven organizations, the new challenges and the competency requirements, and the evolution of the leadership roles and responsibilities. Section III is a part of the book which is devoted to the AI-supported leadership practices. It shows how AI can simplify the processes, make the decisions based on the data and be a strategic advisor and coach. The fourth section deals with the use of AI for team development and performance, which is the main topic of this paper. It is about the improvement of collaboration, the identification of skill gaps and the driving of innovation. Section V deals with the ethical issues and the responsible AI leadership, stressing the need to eliminate the bias, to be transparent and to protect the employee privacy. In the end, the conclusion summarizes the main ideas and gives a forecast for the future of AI-augmented leadership, which is to be the one that is based on human judgment, empathy, and ethics.

II. The Changing Role of Leadership in the AI Era

A. Key factors shaping leadership in AI-driven organizations

The fast speed of technological change, which is caused by the appearance of artificial intelligence (AI), is one of the main reasons for the transformation of leadership in AI-driven organizations. According to Naqvi (2017), "the cognitive revolution will be no different" in its influence on the competitive dynamics and the basis of competition (p. (AI technologies are advancing at such a speed that the leaders should be proactive in their approach, constantly updating their knowledge and skills to be up-to-date and effective in the ever-changing environment). Schwab (2017) emphasizes that the fourth industrial revolution demands leaders who can "shape a future that works for all by putting people first and empowering them" (as cited in Naqvi, 2017, p. 247), highlighting the need for adaptability and people-centric leadership in the face of technological disruption.

Shifting competitive dynamics, fueled by the adoption of AI, presents another significant factor influencing leadership in the AI era. The ability to leverage AI technologies for competitive advantage has become a critical differentiator in many industries. As Naqvi (2017) points out, "leaders would need to be original and not copycats" (p. 247), as the traditional "fads and

fashions style adoption" of new technologies will no longer suffice in the face of AI-driven disruption (p. 247). This shift requires leaders to foster a culture of innovation, encouraging experimentation and calculated risk-taking to stay ahead of the competition. Porter and Heppelmann (2015) argue that unlike previous technological revolutions, the cognitive era will require direct product leadership from executives (as cited in Naqvi, 2017, p. 247), emphasizing the need for leaders to be deeply involved in the strategic deployment of AI.

The evolving workforce composition and skills required in AI-driven organizations pose additional challenges for leadership. As intelligent machines become more prevalent in the workplace, leaders must navigate the integration of human and machine labor, ensuring seamless collaboration and optimal performance. Frey and Osborne (2013) estimate that approximately 50% of human jobs are at risk of being replaced by AI (as cited in Naqvi, 2017, p. 245), necessitating a reskilling and upskilling of the workforce to adapt to new roles and responsibilities. Leaders must proactively identify the skills gap and develop strategies to bridge it, fostering a learning culture that enables employees to acquire the necessary competencies to thrive in an AI-driven environment. As Ronquillo et al. (2021) note, "The challenge for leaders will be to lead their companies through the transformation and minimize the social costs, and to learn and adapt the skills necessary to operate and lead in the post-transformation cognitive era" (p. 248).

B. New challenges and competency requirements for leaders

The pervasive influence of AI in organizations calls for leaders to develop new competencies and address unique challenges. The most urgent need is digital literacy and AI fluency. As Van Quaquebeke and Gerpott (2023) put it, "Leaders should find a way to use the AI in a way that will be beneficial and at the same time, they should be able to control the negative effects of AI to make sure that the AI is used in a responsible and sustainable way" (p. 268). This requires a thorough knowledge of AI technologies, their abilities, restrictions, and ethical aspects. Leaders should be capable of communicating the worth and the risks of AI to the different groups of people, thus, creating the trust and the transparency in the process of adopting AI. Ronquillo et al. (2021) stress that "nurses are the ones who should know about the AI technology they use" (p. (3714) and this principle is applicable to the leaders in all fields. The leaders should get a basic understanding of AI and its consequences for their fields in order to make the right decisions and lead their organizations in a proper way.

The AI era is another challenge for the leaders who have to lead diverse and distributed teams. With the organizations being more and more globally dispersed and technology-enabled, the leaders have to acquire the skills to manage virtual teams efficiently. This entails the creation of a common goal, the keeping of the communication channels open and the use of digital collaboration tools to guarantee the smooth teamwork (Cortellazzoet al. , 2019, as cited in Van Quaquebeke&Gerpott, 2023, p. 266). Besides, leaders should be able to deal with the diversity of thought and expertise that AI-driven organizations usually need, and to create an inclusive

environment that appreciates and uses the unique contributions of each team member. Ronquillo et al. (2021) propose that "educational institutions should create the conditions for the formation of partnerships and collaborations between nursing educators and technology teams, so that nursing students in all levels can work in an interdisciplinary environment and be involved in technology development" (p. The author of the article (p. 3712) stresses the need for the cross-functional cooperation in the process of training leaders for the AI era.

The growing number of human-machine collaborations in AI-driven organizations makes the leaders to acquire new skills in managing this special relationship. According to Naqvi (2017), leaders should be able to "work with machines that in some cases and for some specific tasks, may be more intelligent than the human leaders" (p. 248). This demands a change of the way we think, from the old view of machines as just tools to a new one where humans and machines are partners and work together to achieve the same goals. Leaders should be good at creating human-machine interfaces that are effective, thus, the strengths of both are used while the risks and biases are reduced. Van Quaquebeke and Gerpott (2023) propose that "humans are more likely to accept the negative or developmental feedback from an AI" (p. 269), which suggests that the leaders may have to change their feedback and coaching strategies when they are working with AI-augmented teams.

C. Evolution of leadership roles and responsibilities

The AI implementation in companies is a major factor in the transformation of leadership roles and responsibilities. According to Van Quaquebeke and Gerpott (2023), "The most stable feature of leadership theory is that it is always changing and in a state of flux" (p. 270). In the AI era, there is a marked change from the directive to the facilitative leadership styles. Instead of the top-down command and control approaches, the leaders should empower their teams to work with AI systems, thus creating a culture of experimentation and continuous learning. This means to establish a climate in which the employees are motivated to take the lead in their work, and to provide them with the means and the help to use AI efficiently. Naqvi (2017) implies that "the third industrial revolution was the reason for the great failures of the companies" (p. The author of the article (p. 247) has stressed the significance of the adaptive leadership in the process of overcoming the technological disruptions.

The vision-setting and sensemaking are the main responsibilities of leaders in the AI-driven organizations. With the speed of change increasing and the future becoming more and more uncertain, the leaders have to give the organization a clear and strong vision that will help it to go through the disruption. This is about understanding the complicated and unclear information, finding the patterns and trends, and communicating a common understanding of the problems and the possibilities that are ahead. Besides, leaders should also be good at scenario planning, which is the process of creating several possible futures and strategies to deal with them. Ronquillo et al. (2021) argue that "nurse leaders should be the main advocates for the AI use to

be a more proactive, rather than the reactive approach that is currently seen in healthcare" (p. 3714), thus, underlining the necessity of the farsighted leadership in the AI era.

The other major duty of the leaders in the AI era is to empower the employees to work efficiently with the AI systems. As Ronquillo et al. (2021) note, "The responsibility of having a minimum understanding of AI that all nurses must develop is arguably no different from the requirement of nurses to have a basic understanding and competency in the use of any type of new technology or tool that they use in their practice" (p. 3710). This principle extends to all employees in AI-driven organizations. Leaders must ensure that their teams have the necessary skills, knowledge, and resources to leverage AI effectively, providing training and support to bridge any gaps. Van Quaquebeke and Gerpott (2023) suggest that "leaders educated in AI concepts are perfect for bridging this vocabulary gap" between technical experts and end-users (p. 270), highlighting the crucial role of AI-literate leaders in facilitating effective human-machine collaboration.

D. Leveraging AI for enhanced personal effectiveness as a leader

AI technologies offer significant opportunities for leaders to enhance their personal effectiveness and decision-making capabilities. AI-augmented decision-making is one of the most promising applications, allowing leaders to leverage vast amounts of data and advanced analytics to make more informed and objective decisions. As Naqvi (2017) notes, "With augmented intelligence, leaders will have to learn to function with machines that may at times, and for specific tasks, display more intelligence than the human leaders" (p. 248). By embracing AI as a decision support tool, leaders can mitigate cognitive biases, consider a wider range of variables, and generate insights that may not be apparent through human intuition alone. However, Naqvi (2017) also cautions that leaders must "overcome the evolutionary instincts deeply ingrained in human consciousness" and approach AI-driven decisions "from a machine and data determined objectivity outlook" (p. 248).

Predictive analytics, powered by AI, can also significantly enhance leaders' strategic planning capabilities. By analyzing historical data, identifying patterns, and simulating future scenarios, AI systems can help leaders anticipate trends, assess risks, and make more accurate projections. Van Quaquebeke and Gerpott (2023) state that "AI technologies will be the main factor in the decision-making" (p. 267), thus, leaders can "process different types of data, analyze massive information, learn, and develop insights that are not possible with human intelligence" (p. 267). Through these capabilities, leaders can create more powerful and flexible strategies, which will make their organizations successful in the time of uncertainty. Nevertheless, the leaders have to be aware of the possible restrictions and prejudices of the AI systems and make sure that they are designed and used in an ethical and transparent way, with the human control and accountability measures in place (Ronquillo et al., 2021).

In summary, the changing role of leadership in the AI era is a fine line between the acceptance of the revolutionary power of AI technologies and the keeping of the human qualities that are the essence of the effective leadership. Ronquillo et al. (2021) state that "Above all, objectivity and

ethics will be the most significant" (p. 248) for the leaders who are dealing with the AI-driven world. Through the acquisition of the profound knowledge of AI technologies, the creation of the culture of the constant learning and adaptation, and the prioritizing of the ethical and responsible deployment, the leaders can use the power of AI to drive the innovation, the improvement of the decision-making, and the creation of the value for their organizations while at the same time keeping the human elements of leadership – empathy, creativity, and

III. AI-Supported Leadership Practices

A. Streamlining processes and automating routine tasks

The AI technologies in leadership practices can be the game changer for the leaders, they will be able to do the things in a more efficient way and automate the routine tasks. The intelligent workflows and robotic process automation (RPA) are the two main applications of AI that can greatly increase the leadership efficiency. RPA, for instance, can automate the repetitive, rule-based tasks, thus, the leaders can spend their time on the higher-value activities that need human judgment and creativity. Kokina and Blanchette (2019) state that "RPA is a technology that is very promising for the automation of business processes, with the possibility of cost reduction, efficiency increase, and quality improvement" (p. 1). Through RPA, leaders can pass on the normal administrative tasks like data entry, report generation, and email management to the AI-powered bots, thus they will be able to focus on the more strategic initiatives.

Smart workflows, which are AI driven, can even more improve the leadership processes by automatically adjusting to the changing conditions and by giving the real-time insights and recommendations. Van Quaquebeke and Gerpott (2023) are of the view that "AI-based leader-support dashboards or communication assistance systems will soon be the norm as companies implement them and see better results" (p. 266). These AI-powered systems can process huge amounts of data from different sources, find patterns and anomalies, and give the leaders the information that they need to make the right decisions. Intelligent workflows automate the flow of information and tasks across the organization; thus, the leaders can coordinate and collaborate more effectively, breaking down the silos and fostering the cross-functional teamwork.

The automation of the daily tasks and the introduction of the intelligent workflows can greatly reduce the time of the leaders for the more important activities like the strategic (planning, innovation and people development. According to Titareva, (2021) a [digital] leader will have to be creative and collaborative in a new way to bring together vertically integrated, cross-functional teams of people to perform. Through the AI systems, leaders can free themselves from the routine tasks and concentrate on the human side of leadership, like the creation of relationships, the building of trust, and the inspiration of their teams to reach the common goals. This change of focus from the lower-value activities to the higher-value ones can in the end result in the better performance of the organization, as the leaders will be more capable of dealing with the complexities of the AI-driven environment and will be able to lead the meaningful change.

B. Enabling data-driven decision making

AI technologies can greatly boost the leaders' decision-making skills by giving them the full and real-time performance dashboards and the advanced simulation and scenario planning tools. Berman et al. (2020) says that "CEOs of a small group of enterprises were not afraid of data. On the contrary, they were eager to use it to help to make smarter business decisions, experiment with new business models and build stronger ecosystems" (p. 2). Through the use of AI-powered dashboards, leaders can get a lot of data from different sources such as financial metrics, customer feedback, employee performance, and market trends, all in one place. Such dashboards can be a great tool for the leaders to have a comprehensive view of their organization's performance, thus, they can see the areas of strength and weakness, the progress towards the goals, and make data-driven decisions in real-time.

Besides performance dashboards, AI technologies can also be used for the leaders to do more advanced simulation and scenario planning exercises. Burton et al. (2020) argues that "AI can increase labor productivity by doing low value-added or supporting tasks and thus the workers can concentrate on high value work" (as cited in Plastino & Purdy, 2018, p. 18). Using AI-based simulation tools, the leaders can investigate various strategic options, test the hypotheses and predict the possible results of their decisions. These tools can assist leaders in the identification and mitigation of risks, the evaluation of the effect of different scenarios on their organization, and the development of contingency plans to deal with the uncertainty. Bauer et al. (2022) say that "Algorithms are guided by the probabilistic optimization patterns, just like the empirical research of the different fields at a business school" (p. 4). With AI to process the huge amount of data and detect the trends and patterns, the leaders will be able to make the decisions that are based on the evidence and thus, will lead to the success of the organization.

C. AI as a strategic advisor and leadership coach

AI technologies can also serve as strategic advisors and leadership coaches, providing personalized development recommendations and optimizing communication and engagement with teams. As Naqvi (2017) suggests, "With augmented intelligence, leaders will have to learn to function with machines that may at times, and for specific tasks, display more intelligence than the human leaders" (p. 248). By leveraging AI-powered coaching tools, leaders can receive tailored feedback and recommendations based on their individual strengths, weaknesses, and leadership styles. These tools can analyze a leader's behavior, communication patterns, and decision-making processes, and provide targeted suggestions for improvement, helping leaders develop their skills and capabilities over time.

AI-powered coaching tools can also help leaders optimize their communication and engagement with their teams. As Brynjolfsson and Mcafee (2017) note, "AI can augment labor productivity by taking on low value-added or supporting tasks and thus enable workers to focus on high value work" (as cited in Plastino & Purdy, 2018, p. 18). By analyzing team dynamics, communication patterns, and individual preferences, AI systems can provide leaders with insights on how to

tailor their messaging, provide feedback, and motivate their teams more effectively. For example, an AI-powered tool could analyze a leader's email communication and provide suggestions on how to improve the tone, clarity, and effectiveness of their messages, based on the recipient's personality and communication style. By leveraging these personalized insights, leaders can build stronger relationships with their teams, foster a more positive and engaging work environment, and ultimately drive better performance and results.

D. Developing AI fluency and adopting an AI mindset

To make the most of the AI-supported leadership practices, the leaders need to be AI fluent and have an AI mindset. This means that the company has to be ready to learn and experiment all the time and also to be able to predict the second and third-order effects of AI implementation. According to Van Quaquebeke and Gerpott (2023), "Leaders have to find a way to use the positive side of AI and at the same time to prevent the negative side of it in order to make the adoption of AI responsible and sustainable" (p. 268) The AI fluency of the leaders is a process that needs time and effort to be invested in understanding the capabilities, limitations, and ethical implications of AI technologies. It also involves being in the know of the latest trends in the field, going to workshops and conferences, and doing experiments with AI tools and platforms.

The AI mindset also implies a change of the way of thinking, from considering AI as just a tool to understanding it as a strategic asset that can be the driver of innovation and competitive advantage. Naqvi (2017) points out that, "The massive transformation brought by technological revolutions makes the executives to both relearn and unlearn" (p. 247). Leaders should be ready to question their own beliefs, accept the new ways of working, and always change their strategies and practices in accordance with the AI world that is constantly changing. This is only possible if there is a culture of experimentation, where leaders motivate their teams to try new things, learn from their mistakes, and improve based on the feedback and data.

Besides, the leaders should also be able to forecast the second and third-order effects of AI implementation on their organization and stakeholders. According to Ronquillo et al. (2021), "AI technologies can have unintended consequences that can have a potential negative impact on the nursing profession and on the main aims of nursing practice" (p. 3709). This principle applies to all the areas where AI is being used. Leaders should think about the possible dangers and the side effects of AI use, for example, job loss, algorithmic bias, and privacy issues, and then come up with the ways to prevent these risks. Through the proactive, forward-looking strategy to the AI implementation, the leaders can make sure that the advantages of AI are obtained while the possible negative effects on their organization and society are reduced.

In summary, AI-supported leadership practices are the means to the leaders' effectiveness and decision-making capabilities. Through the simplification of the processes, the automation of the routine tasks, the data-driven decision making and the provision of the personalized coaching and advice, the AI technologies can help the leaders to deal with the complexities of the AI-driven landscape and to achieve better outcomes for their organizations. Nevertheless, in order to

make the most of the AI-supported leadership, leaders also need to acquire AI fluency, adopt an AI mindset, and foresee the second and third-order effects of AI implementation. Through the investment in continuous learning, the experiments and the ethical considerations, the leaders can use the power of AI to be the driver of the innovation, the competitive advantage and the positive social impact in the future.

IV. Employing AI for Team Development and Performance

A. Enhancing team communication and collaboration

AI technologies can significantly enhance team communication and collaboration, particularly in today's increasingly digital and distributed work environments. AI-facilitated meeting management is one such application that can help leaders optimize team interactions and ensure productive outcomes. As Turesky, Smith, and Turesky (2020) note, "the digital leader will exemplify traditional leadership concepts while embracing new trends to influence their peers and drive performance outcomes" (as cited in Petrucci & Rivera, 2018, p. 55). AI-powered tools can assist in scheduling meetings, generating agendas, capturing and distributing meeting notes, and even analyzing participant engagement and sentiment. By automating these administrative tasks, leaders can focus on facilitating meaningful discussions and driving actionable outcomes.

Real-time translation and interpretation, powered by AI, can further enhance team communication and collaboration, especially in global and multicultural organizations. As Davenport and Kalakota (2019) suggest, "AI can augment labor productivity by taking on low value-added or supporting tasks and thus enable workers to focus on high value work" (p. 97). Through the use of AI-based translation tools, the leaders can overcome the language barriers and thus, all the team members can effectively communicate and share their ideas, no matter what their native language is. This can be a way of creating a more inclusive and diverse work environment where different views and experiences are appreciated and used for innovation and problem-solving.

B. Analyzing skill gaps and facilitating targeted upskilling

AI technologies can also be used to identify the skill gaps in teams and thus the targeted upskilling efforts can be carried out. With the speed of technological change getting faster, it is more and more vital for leaders to make sure that their teams have the required skills and competencies to be successful in the AI-driven world. The AI-based tools can process employee performance data, job descriptions, and industry trends to find the skill gaps and suggest personalized learning and development plans for each team member. Rock and Schwartz (2007) state that "the neuroscience of leadership is the science of how the brain works and the application of this knowledge to the art of leadership" (p. 10).By leveraging AI-powered learning platforms, leaders can provide their teams with targeted, engaging, and effective training experiences that are tailored to their individual needs and learning styles.

AI-powered mentoring and coaching platforms can further support employee development by connecting team members with relevant experts and resources across the organization. As Sawar (2022) notes, "AI technologies (e.g., clinical decisions support systems) incorporate a holistic patient perspective, support care provision based on patient's goals and priorities, and proactively consider ethical concerns that can arise from using the technology, as part of the development process" (p. 3713). Similarly, AI-powered mentoring platforms can match employees with mentors and coaches based on their goals, interests, and development needs, providing them with personalized guidance and support to help them grow and advance in their careers. By investing in AI-powered upskilling and mentoring initiatives, leaders can build a more agile, adaptable, and future-ready workforce that can effectively navigate the challenges and opportunities of the AI-driven landscape.

C. Deploying AI tools to boost productivity and results

AI technologies can also be deployed to boost team productivity and drive better business results. Predictive project management and resource allocation, which is driven by AI, can assist the leaders to optimize team performance and guarantee that projects are finished on time and within the budget. Hoffman (2016) points out that "AI can boost labor productivity by doing the low value-added or supporting tasks and thus workers can concentrate on the high value work" (p. 4). Through the study of the historical project data, the resource availability, and the team member skills and capacities, the AI-powered project management tools can give the leaders the real-time insights and recommendations on how to allocate the resources, to prioritize the tasks, and to mitigate the risks. This can be of great help to leaders in making better decisions, foreseeing the possible problems and dealing with them before they affect the project results.

Intelligent task routing and load balancing, which is the AI-powered, can also increase the team productivity by the fact that the right tasks are assigned to the right team members at the right time. Arias and Iglesias (2022) point out that "AI can increase the labor productivity by doing the low value-added or supporting tasks and thus enable the workers to concentrate on the high value work" (p. 6). Through the analysis of the team members' skills, workload, and availability, the AI-powered task management tools can automatically route the tasks to the most appropriate team members, balance the workloads across the team, and make sure that everyone is working on the highest-priority tasks. This can be of great help to the leaders to increase the team efficiency, decrease the burnout and stress, and make sure that everyone is using their own skills and knowledge to get the best results.

D. AI-powered solutions for employee growth and team building

AI technologies can also be used for employee development and team building, thus, creating a more involved, motivated, and productive workforce. AI driven hiring and onboarding processes, which are the key to the best talent identification and the simplification of the recruitment and selection processes will make the new hires to be successful from the first day. According to Raisch and Krakowski (2020), "AI can increase labor productivity by doing the tasks that have

no value or are supporting and hence the workers can concentrate on the work that have the value" (p. 196). Through the analysis of job requirements, candidate profiles and the historical performance data, the AI powered hiring tools can help the leaders to identify the most qualified candidates, cut the bias in the selection process and make sure the new hires will be a good fit for the team and the organization. The AI-based onboarding tools can go further in the support of the new hires by personalizing the training, connecting them with the relevant resources and mentors, and tracking their progress and engagement over time.

The AI-powered way of enhancing the employee engagement and retention is the way of team building and long-term organizational success. The authors of Alhashmi et al. (2022) point out that "AI can be used to increase the labor productivity by taking on the low value-added or supporting tasks and thus workers can concentrate on the high value work" (p. 3). Through the analysis of employee feedback, performance data, and engagement metrics, AI-powered tools can give the leaders real-time insights into team morale, satisfaction, and retention risks. Leaders can then use these insights to preventproblems, offer individualized help and recognition, and thus make the work environment more positive and inspiring. Artificial intelligence tools can also assist leaders in the identification and development of the staff members with the highest potential. They can be provided with personalized career development plans and be given opportunities for growth and promotion within the organization.

E. Leveraging AI to catalyze creativity and drive innovation

AI technologies can be used to boost creativity and, thus, innovation in teams and organizations. Intelligent ideation and brainstorming tools that are controlled by AI, can assist the leaders and their teams to create new ideas, to investigate different views and to find the best chance for innovation. Cockburn, Henderson, and Stern (2018) point out that "AI is now a major tool used for making decisions in the field of corporate strategy development and in the R&D departments and the innovation industry" (p. The AI-pushed ideation tools can help teams to find out new trends, consumer needs, and areas for innovation by analyzing the huge amount of data from different sources such as customer feedback, market trends, and competitive intelligence. These tools are also able to help in the joint work sessions, the team members can use them to develop their ideas and to find new ones in real time.

The rapid prototyping and the experimentation support, which are driven by AI, can make the innovation process even faster by allowing the teams to test and refine the new ideas and concepts quickly. Wiltz (2017) states, "AI-A two-armed collaborative humanoid robot, in close cooperation with and under the meticulous preparation of the human director of the Philharmonic Orchestra, conducted Italian tenor Andrea Bocelli at a charity concert" (as cited in Van Quaquebeke&Gerpott, 2023, p. 268). Also, the AI-powered prototyping tools can assist teams in the quick creation and testing of digital prototypes, simulations, and virtual environments, thus they can gather feedback, detect the potential issues and refine their ideas before the substantial time and resources are invested in the full-scale development. Through the help of AI to facilitate

the fast experimentation and iteration, leaders will be able to create a culture of innovation within their teams, where everyone will be encouraged to come up with new ideas, take calculated risks, and continue to improve and develop their products, services, and processes.

In summary, the use of AI for team development and performance can help the leaders create more collaborative, skilled, productive, and innovative teams that are well-prepared to succeed in the AI-driven environment. By using AI technologies to improve communication and collaboration, analyze the skill gaps and facilitate the upskilling, increase the productivity and the results, support the employee growth and the team building, and stimulate the creativity and the innovation, leaders can create the high-performing teams which can effectively deal with the challenges and the opportunities of the future. Nevertheless, it is the leaders' duty to deal with the introduction of AI technologies cautiously and consciously, so that they are used in an ethical, transparent, and responsible way that puts the team members on the top of the priority list. Through the right combination of AI-powered tools and the human touch of leadership, leaders can make the work environment more engaging, empowering and future-ready that will lead to the long-term success and growth of their organizations.

V. Ethical Considerations and Responsible AI Leadership

A. Addressing bias and ensuring fairness in AI systems

The AI systems are getting more and more integrated into the leadership practices and the organizational decision-making, so it is very important for the leaders to take the initiative to tackle the possible biases and to make sure that the AI systems are fair. AI algorithms are as unbiased as the data they are trained on, and if that data is a reflection of the historical biases or it is underrepresenting some groups, the resulting AI systems can be the ones to perpetuate or to amplify those biases. According to Shukla et al. (2017), "AI will be a source of crucial information for the leaders. "Through network analysis, technology will enable the digital leader to understand complex flows of interactions and activities in agile networks of teams and … AI connects the dots for the digital leader and their followers" (p. 1087). However, if those "dots" are connected based on biased data, the insights and recommendations provided by the AI system may be skewed and unfair.

In order to lessen these risks, the leaders should take part in the proactive bias testing and mitigation strategies. This includes the detailed examination of the used data to train the AI systems, making sure that it is a true reflection of the different populations that the organization serves, and actively looking for and eliminating any biases or disparities. As Renieris, Kiron, and Mills (2022) propose, "The organizations need to be ready to identify and suppress the risks of bias and discrimination in their AI systems and make their use of AI corresponding to their general CSR [Corporate Social Responsibility] goals and values" (p. 2). Proactively, leaders can check for bias and then correct it before the AI system is put into use so that it is fair, inclusive, and in line with the organization's values and ethical principles.

The other main point of responsible AI leadership is to make sure that the data is representative, and the algorithms are inclusive. Since AI systems are based on the huge datasets that they need to learn and make decisions, it is crucial that this data really shows the diversity of the populations the organization serves. Leaders have to cooperate with data scientists and AI developers to make sure that the data used to train AI systems is representative and inclusive and that the algorithms are designed to be fair and unbiased. Goddard (2023) states, "The leaders can easily manipulate the artificial intelligence technology. The recent allegations of foreign countries interfering in the elections of other countries and using smart bots to influence people are the clear proof that leaders can easily exploit the artificial intelligence technology to gain the advantage to influence others" (p. 1). The leaders can protect society from such manipulation by the AI systems if they make sure that these systems are based on the representative data and inclusive algorithms.

B. Transparency and explainability of AI-aided decisions

Transparency and explainability are the two key elements that should be considered in the ethical use of AI for leadership and decision-making. The fact that AI systems are becoming more and more complicated and autonomous makesit is hard for the leaders and other stakeholders to understand how these systems make decisions and recommendations. The lack of transparency is the reason of the loss of the trust in AI systems and thus the problem of holding them responsible for their outcomes. As Egan and Chesley (2018) argue, "Knowing that what can be automated will be automated gives significant importance to what makes us uniquely human: These are the elements that will be the main factors in the future of work. They are curiosity, humor, empathy, creativity, wisdom, and passion. 1). To ensure that the AI-aided decisions are transparent and understandable, the leaders need to work with the AI developers to record the assumptions, limitations and decision-making processes of these systems.

The process of recording assumptions and limitations is a crucial component of the steps that are taken to ensure that the decisions that are made by AI are transparent and explainable. Thus, the way of stating the data, algorithms, and models that were used in the training of the AI system, as well as the assumptions and constraints that were used in the development process, is the way to go. Goltz and Adessky (2023) state that "The process of finding the way in the field of AI replacement shows two big problems, one is in the details of liability and the other is in the world of trust" (p. 5). The leaders can note the assumptions and limitations of AI systems and thus, the trust in these systems can be built and the way they are used can be made responsible and accountable.

Besides, human control should be the one that is able to monitor the AI-aided decisions and thus, the transparency and explainability of the AI-aided decisions should be guaranteed. Even though AI systems can provide us with the necessary information and suggestions, it is still important that human leaders can check, analyze and change these decisions when needed. As Krcil (2020) states, "The complex task of AI deployment is centered on the coordination of different

stakeholders which is the basic principle of success. The various challenges of bringing together the different stakeholders are all based on the legal aspects and the necessity of communication" (p. 23). 49). The leaders can be sure that the AI-aided decisions are in accordance with the organization's values, goals, and ethical principles and that the human judgment and expertise are not replaced by the AI systems by the human oversight of the AI-aided decisions.

C. Privacy, security and governance of workforce data

As AI systems rely on vast amounts of workforce data to learn and make decisions, ensuring the privacy, security, and governance of this data is a critical ethical consideration for leaders. Employees have a right to expect that their personal data will be collected, stored, and used in a responsible and secure manner, and that their privacy will be protected. As Li (2023) notes, "AI technology comes with many risks and challenges, including issues related to data privacy, security, and ethical concerns" (p. 1). To address these risks, leaders must work with IT and security professionals to implement secure architectures and access controls that protect employee data from unauthorized access, breaches, or misuse.

Secure architectures and access controls are essential for protecting workforce data in AI systems. This involves implementing robust security measures, such as encryption, firewalls, and multi-factor authentication, to prevent unauthorized access to sensitive data. As UNESCO (2023) recommends, "Education systems will have to strengthen the skills of their students, school leaders and teachers to train them to work proactively and discerningly with AI" (p. 5). By implementing secure architectures and access controls, leaders can ensure that workforce data is protected from cyber threats and that only authorized personnel have access to this data.

Employee consent and control over personal data is another critical aspect of responsible AI governance. Employees have a right to know what personal data is being collected about them, how it is being used, and who has access to it. As Ronquillo et al. (2021) suggest, "Leaders must ensure that AI systems are designed and implemented in an ethical and transparent manner, with appropriate human oversight and accountability measures in place" (p. 13). This involves obtaining employee consent for the collection and use of their personal data, providing clear and accessible privacy policies, and giving employees the ability to access, correct, and delete their personal data when necessary. By prioritizing employee consent and control over personal data, leaders can build trust in AI systems and ensure that workforce data is used in a responsible and ethical manner.

D. Enabling human agency and accountability

Finally, enabling human agency and accountability is a critical ethical consideration in the use of AI for leadership and decision-making. While AI systems can provide valuable insights and recommendations, it is essential that human leaders retain the ability to make final decisions and be held accountable for the outcomes of those decisions. As Grønsund and Aanestad (2020) argue, "A promising research area will thus be to study how we can prevent the 'diffusion of

responsibility' for human wellbeing when AI leaders are in charge" (p. 2). To enable human agency and accountability in AI-aided decision-making, leaders must implement human-in-the-loop frameworks and establish clear protocols for AI system overrides.

Human-in-the-loop frameworks involve designing AI systems in a way that keeps human judgment and oversight at the center of the decision-making process. This means that while AI systems may provide recommendations or insights, human leaders are ultimately responsible for interpreting that information, considering the broader context and implications, and making final decisions. As Morgan et al. (2022) note, "The federal government has introduced Bill C-27, the Digital Charter Implementation Act, 2022, which aims to regulate the development and use of AI systems in Canada" (p. 1). By implementing human-in-the-loop frameworks, leaders can ensure that AI systems are used in a way that augments and supports human decision-making, rather than replacing it entirely.

Clear protocols for AI system overrides are another essential component of enabling human agency and accountability in AI-aided decision-making. There may be situations where an AI system recommends a course of action that a human leader disagrees with or feels is not appropriate given the broader context. In these cases, it is essential that leaders have the ability to override the AI system and make a different decision. As Van Quaquebeke and Gerpott (2023) suggest, "The question is not anymore whether AI will play a role in leadership, the question is whether we will still play a role. And if so, what role that might be" (p. 272). By establishing clear protocols for AI system overrides, leaders can ensure that they retain the ability to exercise judgment and make decisions that are in the best interests of their organizations and stakeholders.

In summary, addressing the ethical considerations of AI in leadership is essential for ensuring that these technologies are used in a responsible, fair, and accountable manner. By proactively addressing bias and ensuring fairness in AI systems, promoting transparency and explainability of AI-aided decisions, prioritizing the privacy, security, and governance of workforce data, and enabling human agency and accountability, leaders can harness the power of AI to drive positive outcomes for their organizations and stakeholders, while mitigating the risks and challenges associated with these technologies. Ultimately, responsible AI leadership requires a commitment to ongoing learning, collaboration, and ethical reflection, as the capabilities and implications of these technologies continue to evolve over time.

VII. Conclusion

The rapid advancement and widespread adoption of artificial intelligence (AI) technologies are transforming the nature of leadership in organizations across industries. As AI systems become increasingly sophisticated and integrated into various aspects of organizational operations, leaders must adapt to this new landscape and develop the skills and strategies needed to harness the power of AI while mitigating its risks and challenges.

Throughout this paper, we have explored the transformative impact of AI on leadership, focusing on the changing roles and responsibilities of leaders in the AI era, the opportunities and challenges associated with AI-supported leadership practices, the importance of employing AI for team development and performance, and the critical ethical considerations and principles of responsible AI leadership.

We have seen how the rapid pace of technological change, shifting competitive dynamics, and evolving workforce composition and skills are reshaping the context in which leaders operate, requiring them to develop new competencies such as digital literacy, AI fluency, and the ability to lead diverse, distributed teams and manage human-machine collaboration effectively. We have also explored how AI technologies can support leaders in streamlining processes, automating routine tasks, enabling data-driven decision-making, and serving as strategic advisors and coaches, while also highlighting the importance of developing an AI mindset and anticipating the second and third-order effects of AI implementation.

Moreover, we have examined how AI can be employed to enhance team communication and collaboration, analyze skill gaps and facilitate targeted upskilling, boost productivity and results, support employee growth and team building, and catalyze creativity and drive innovation. However, we have also emphasized the critical importance of addressing bias and ensuring fairness in AI systems, promoting transparency and explainability of AI-aided decisions, prioritizing the privacy, security, and governance of workforce data, and enabling human agency and accountability in the use of AI for leadership and decision-making.

Looking to the future, we envision a model of AI-augmented leadership, where human leaders and AI systems work together in a symbiotic relationship to drive organizational performance, innovation, and positive social impact. In this vision, AI technologies are not seen as a replacement for human leadership, but rather as a powerful tool that can augment and enhance leaders' capabilities, enabling them to make more informed, data-driven decisions, identify and capitalize on emerging opportunities, and lead their organizations and teams more effectively.

However, realizing this vision of AI-augmented leadership will require a proactive and purposeful approach from leaders at all levels. It will require leaders to invest in their own learning and development, to build their AI fluency and digital literacy, and to stay abreast of the latest developments and best practices in AI and leadership. It will require leaders to champion the responsible and ethical use of AI within their organizations, to ensure that AI systems are designed and implemented in a way that aligns with organizational values and prioritizes the well-being and development of employees. And it will require leaders to foster a culture of continuous learning, experimentation, and adaptation, where employees are empowered to work alongside AI systems and to contribute their unique skills and perspectives to drive organizational success.

To that end, we call on leaders across industries and sectors to embrace the opportunities and challenges of AI, and to begin preparing themselves and their organizations for the future of

work. This means taking a proactive approach to understanding the capabilities and limitations of AI technologies, to identifying the areas where AI can be most effectively leveraged to support leadership and decision-making, and to developing the skills and strategies needed to lead in an AI-augmented world.

At the same time, we emphasize the critical importance of coupling AI with human judgment, empathy, and ethics. While AI systems can provide powerful insights and recommendations, they are not a substitute for human wisdom, creativity, and moral reasoning. Leaders must remain vigilant in ensuring that AI is used in a way that benefits all stakeholders, that prioritizes human well-being and development, and that aligns with the highest standards of ethical conduct and social responsibility.

Ultimately, the success of AI-augmented leadership will depend on the ability of leaders to strike the right balance between leveraging the power of AI and preserving the essential human qualities that define effective leadership. It will require leaders to be adept at managing the complex interplay between people and machines, to be skilled at fostering trust, collaboration, and innovation in hybrid human-AI teams, and to be committed to using AI in a way that promotes fairness, transparency, and accountability.

As we move forward into an increasingly AI-driven future, it is our hope that this paper will serve as a valuable resource and guide for leaders seeking to navigate this new landscape. By understanding the transformative impact of AI on leadership, by embracing the opportunities and challenges of AI-augmented leadership, and by committing to the principles of responsible and ethical AI use, leaders can position themselves and their organizations for success in the years and decades to come. So let us move forward with courage, curiosity, and a deep commitment to using AI in a way that benefits all of humanity, and that helps us to build a better, brighter, and more equitable future for all.

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